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REVIEW

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Using realist approaches in nutrition and dietetics research

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Abstract

Aim: The aim of this study was to explore the use and future potential of realist approaches to research in nutrition and dietetics.

Methods: A targeted literature review was used to search key journals ($n = 7$) in nutrition and dietetics to identify existing research using a realist approach. A narrative synthesis was conducted to explore findings in relation to the research aim.

Results: Nine research papers (four realist evaluations, five realist reviews) describing seven nutrition interventions were found, which revealed the application of realist research in nutrition and dietetics has focused on public health interventions. Realist research provided a deeper, more nuanced understanding of varied outcomes including the role of context, and contributed to the development of theory about how and why interventions work. As a theory-driven research method, realist research was able to assist in overcoming methodological shortcomings to contribute to meaningful, transferable findings.

Conclusion: The results highlight the potential contribution of the realist research in nutrition and dietetics to evaluate interventions and inform future practice.

KEYWORDS

Behavior And Behavior Mechanism, context, dietetics, program theory, review, realist evaluation, realist synthesis

1 | INTRODUCTION

Nutrition and dietetics research spans a wide range of topics across a range of different settings and contexts using a range of different research methodology and methods. With such diversity comes the need for a range of research approaches. Nutrition and dietetics is still

dominated by a positivist approach to research,¹ with randomised control trials (RCTs) perceived as the gold standard in terms of methods.² RCTs are used to explore the effects of interventions.³ While there are a number of benefits to RCT implementation, the ability to explore cause and effect relationships through the use of a control group is its main strength. This is suitable for some areas of nutrition and dietetics research; however, the practicalities of achieving this in other areas are

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markedly different. This is because such research typically takes place in complex settings, where a control group is unfeasible and possibly unethical. In addition, the impact of the human agency element in these interventions introduces confounding variables that can nullify the strengths of the RCT.⁴ Nutrition and dietetics research requires approaches that still allow investigators to explore causation but acknowledge complex and social elements of research in this field. Realist methodology offers an alternative approach.

Realist methodology provides one such approach for dealing with the complexity of nutrition interventions. It is grounded in realist philosophy,⁵ of which the key tenets include: the belief that social reality is real but only knowable indirectly; complex social interventions can act at all levels of context; and, generative causation—‘the theoretical and statistical elaboration of an underlying, generative causal process existing in time and space, including also actors who make decisions within social contexts’.⁶ Broadly speaking, realist philosophy sits on a spectrum between positivist and constructivist approaches. It shares the ontological perspective of a positivist approach that there is a knowable real world, however, epistemologically it sits closer to constructivism. Positivism maintains that only knowledge that is observable is true, while realism and constructivism posit true knowledge as being indirectly knowable. Realism deviates from a completely constructivist epistemology in that it bases knowledge construction on the interpretation of causation.⁷

Realist research is referred to as a ‘theory led’ form of research, whereby the essential premise is that all programs, policies or interventions are ‘theories incarnate’,⁸ that is, when resources are provided in a certain way, to a certain group, it produces certain outcomes.^{9,10} A realist approach has an explanatory focus and is designed to interrogate the ‘program theory’ of an intervention. Such interrogation results in the identification of mechanisms, which are underlying generative causal processes and how they interact with context to contribute to the intended and unintended outcomes of interventions. Statements about the relationship between context, mechanisms and outcomes (referred to as CMO configurations) are developed and contribute to understanding how, under what circumstances and why a complex social intervention may or may not work.⁴ In particular, mechanisms allow the researcher to unpack the ‘black box’ of how and why interventions lead to certain outcomes. This is a key difference from non-realist methodologies and is what makes a realist approach so beneficial.

Pawson and Tilley developed and championed the version of realist methodology discussed in this paper.⁹ They translated realist methodology into practical methods to do evaluation^{11,12} and evidence synthesis.^{8,13}

Realist evaluation usually uses primary data and realist synthesis (or realist review) is a form of systematic literature review⁸ that uses mainly secondary data. In both types, researchers focus on theory as the unit of analysis and synthesise findings to develop, test and refine explanatory program theory about how an intervention, or types of interventions, work across different contexts.¹⁴ Researchers can look across similar program theories to explore patterns that can contribute to the theoretical understanding of these interventions. An intention of realist programme theory building and refining is to arrive at a more ‘Middle-Range’ Theory of the intervention, what Merton, defined as ‘...theories that lie between the minor but necessary working hypotheses that evolve in abundance during day to day research and the all-inclusive systematic efforts to develop a unified theory that will explain all the observed uniformities of social behaviour, social organization and social change’.¹⁵ The development of middle-range theory allows for transferability of findings to programs with similar underlying theories.

A realist approach does not prescribe a specific method for evaluating interventions, instead recommending methods which will best fit the study and provide explanatory data. As such, where positivists traditionally focus on quantitative data, realists are avowedly mixed methods and acknowledge the utility of other data in intervention theory building and refining. This is because these data sources are also particularly valuable for providing important contextual information which is important in realist approaches to help describe how the intervention works and in what circumstances. There is potential for realist research to address difficulties in the current state of nutrition and dietetics research, as it acknowledges the complex and social aspects of an intervention in seeking to explain the underlying causes of intervention effects. It also provides opportunity to scaffold existing theory in nutrition and dietetics, particularly in relation to the interplay of human agency and social interactions foundational to behaviour change.¹⁶ It has also been proposed that despite a heavily theoretical underpinning, development of a causal hypothesis can influence policy makers and make a case for the benefits of social interventions¹⁷ (see Table 3 for a glossary of definitions).

Despite the potential for realist research to address the difficulties in the current state of nutrition and dietetics research, there is a paucity of information about how and to what extent realist approaches are used in the discipline, and to what effect. Therefore, the purpose of this review is to find out how realist approaches are used in nutrition and dietetics research and what impact this had on findings, outcome, and research translation. In presenting this synthesis, we aim to inform the future

potential of realist approaches in nutrition and dietetic research and evaluation.

2 | METHODS

In the interest of trying to summarise how realist research could be useful in nutrition and dietetics, this study employed a targeted literature review and narrative synthesis.¹⁸ Key journals in nutrition and dietetics were identified by the authors as *Journal of the Academy of Nutrition and Dietetics*, *Journal of Human Nutrition and Dietetics*, *British Journal of Nutrition*, *Canadian Journal of Dietetic Practice and Research*, *European Journal of Clinical Nutrition*, *Nutrition Reviews*, *Nutrition and Dietetics and Public Health Nutrition*. The search terms 'realist' and 'realism' were entered into all of the journal websites in June 2020 by the first authors. No date range or restrictions to language or geographical location were applied. Search results were exported to EndNote¹⁹ and full text retrieved. At this stage, the reference lists of exported full-text publications were hand-searched to identify additional relevant publications, which were also exported.

The first authors reviewed all full-text publications in relation to study aim. Only full-text publications that described realist research related to nutrition and dietetics were included. Data extraction for included publications was managed using a Microsoft Excel²⁰ template. One author independently extracted data for included realist evaluation papers and a second author for realist review papers. Extracted data included publication year, location, aim, design, study population, substantive or existing theory about intervention, results (including relevant quotes), how the realist approach impacted the study findings, outcome and research translation and design limitations. The research team then came together to discuss extracted data. During discussions, the research team identified initial impressions on how the approach had been used and what impact the approach had on the study's findings. The first authors then conducted a second review of included papers, with a focus on extending and consolidating the synthesis. Additional data and supportive quotes were extracted in relation to emerging ideas. The final analysis was discussed among the research team who affirmed the findings which are reported below under key headings that summarise the narrative synthesis.

3 | RESULTS

The search identified nine research papers (four evaluations²¹⁻²⁴ and five reviews²⁵⁻²⁹) describing seven

interventions in nutrition and dietetics that applied a realist approach. All were included in the narrative synthesis. Table 1 provides an overview of the key data extracted for the four included evaluations, and Table 2 for the five included reviews. A description of the included interventions is also provided below.

For all included studies, the majority of research came from the UK ($n = 6$)^{21,24-27,29} with two studies from Canada^{22,23} and one from Australia.²⁸ All were public health interventions focused on primary prevention, including school food and nutrition ($n = 3$),^{22,23,27} breastfeeding support ($n = 2$),^{24,25} food literacy ($n = 2$),^{28,29} and food and nutrition security ($n = 2$).^{21,26} Most papers identified existing theory about the intervention and its effects ($n = 6$),^{22,23,25,27-29} including existing formal theory, such as the Health Belief Model³¹ and Social Cognitive Theory,³² or specific intervention theory developed by researchers.

The realist evaluation studies described data collection with diverse participant groups, including the intervention target population/s ($n = 4$),²¹⁻²⁴ health professionals and/or other stakeholders involved in intervention delivery ($n = 3$)²²⁻²⁴ or a combination of these ($n = 3$).²²⁻²⁴ Common research methods were used to gather qualitative data; semi-structured interviews ($n = 4$),²¹⁻²⁴ questionnaires ($n = 3$),²²⁻²⁴ observation ($n = 3$).²²⁻²⁴ None of the realist evaluation studies reported quantitative data collection. All four realist evaluation studies included data pertaining to refined intervention theory. Limitations described were those commonly reported in research, including small sample size ($n = 2$),^{21,24} low response rate ($n = 1$)²⁴ or single participant group or geographical setting ($n = 3$).^{21,23,24}

The number of primary studies included in the five realist reviews ranged from 11²⁸ to 39.²⁹ Quality appraisal was reported in three of the five studies.^{25,26,28} Four of the five studies reported the identification of formal theories.^{25,27-29} Four of the five studies alluded to a lack of contextual information that hindered the development of intervention theories.²⁶⁻²⁹

A number of research papers described varied intervention outcomes in existing research, which required further exploration:

'...little research has elaborated on this in the Canadian context and explored social processes associated with implementation occurring at the level of school districts to help explain how and why district practices may contribute to different levels of policy compliance'.²³

The realist reviews were able to use existing theory in the development of intervention theory. For example, Greenhalgh et al conducted a realist review on

TABLE 1 Summary of the included published realist evaluations from nutrition and dietetics specific journals included in narrative synthesis

| Reference | Aim | Setting | Participants | Intervention | Existing theory | Methods | Results | Limitations |
|---------------------------|--|--|--|---|---|---|--|---|
| Ohly et al ²¹ | Explore potential program outcomes and explain how and why these might occur | North West England, United Kingdom Participants were recruited through midwifery services, drop in sessions such as breastfeeding support groups, children's centres and social media | Low income pregnant women | Healthy Start food voucher program, government food relief initiative | Nil | Qualitative Data collected using semi-structured interviews using realist interviews (see glossary) | Outcomes, including intended (dietary improvement) and unintended (shared benefits, financial assistance, stockpiling formula). Influenced by context (women's circumstances, values, beliefs, motivation) Identified and refined mechanisms to explain varied outcomes (eg, prioritising unborn baby or children over themselves) | Most women experienced multiple outcomes and was not able to explain how they overlapped Small sample size and specific participant group limited refinement of other program theories |
| Levay et al ²² | Answer the question: What processes at school district level drive the implementation of a mandatory school food and drink policy? | Canada Five school-districts in British Columbia, including three urban and two rural | For each district: School-district-level staff, public health stakeholders, private food vendors School-level administrative staff, parents, school food staff and one teacher | School food and drink sales policy | Existing program theory developed by researchers. ³⁰ If district-level staff were provided with information about the necessity of improving school food environments and how implementing the policy will fill this need, it would increase motivation to implement guidelines which would lead them to access the implementation tools and other resources, assess existing school food environments and, if needed, make changes to what is for sale in schools. | Multiple case study approach Qualitative data collected using semi-structured interviews, structured questionnaires, observation, website scans | Identified three mechanisms influencing the implementation of policy at school district level 1 Mandatory: Mandatory nature of policy, influenced by normative acceptance of education systems hierarchy 2 Money: Demand leads vendors to create a compliant supply of products, driven by beliefs about children's food preferences, health and food and the existence of competition 3 Monitoring: Systems of informal monitoring are used to promote compliance in the context of a competitive sales environment | Inconsistency of data sources across cases due to variation in how school districts allowed data collection. |
| Levay et al ²³ | Identify key school level contexts and mechanisms associated with implementing a provincial school food and beverage policy | Canada Five school-districts in British Columbia, including three urban and two rural | For each district: Regional and provincial education stakeholders, private food vendors, school administrators, teachers, other school-level staff and parents | School food and drink sales policy | Existing program theory developed by researchers and described above ^{22,30} | Multiple case study approach Qualitative data collected using semi-structured interviews, structured questionnaires, observation, website scans Analysis and coding for CMO configurations within and across case studies | Identified four mechanisms influencing implementation of policy and dimensions of context that influenced these 1 Mandatory: Mandatory policy triggered some actors' implementation efforts, influenced by their normative acceptance of the educational governance system 2 Scofflaw: Some expected implementers had an opposite response to the mandate where they ignored or 'skirted' the policy, influenced by values and beliefs about the role of government and school food 3 Economic: Vendors' responses to school demand for compliance with nutritional guidelines were mediated by beliefs about food preferences of children, health and food 4 Resource constraints: Resource constraints and lack of capacity led otherwise motivated stakeholders to not implement the mandatory policy | Only examined school-level implementation, however school-district level stakeholders examined in Levay 2019 ²² |

(Continues)

TABLE 1 (Continued)

| Reference | Aim | Setting | Participants | Intervention | Existing theory | Methods | Results | Limitations |
|----------------------|---|----------------------------------|--|--|-----------------|--|---|---|
| Hunter ²⁴ | Study the context of breastfeeding support and evaluate a targeted breastfeeding support intervention for young women | United Kingdom Postnatal ward | Health professionals and young (teenage) mothers | Breastfeeding support package, including training staff to deliver structured, proactive breastfeeding support to young mothers in a designated area of the postnatal ward, using checklists adapted from the United Nations Children's Fund (UNICEF) Baby-Friendly Initiative | Nil | Qualitative data collected using pre- and post-training questionnaires, semi-structured interviews, evaluation forms, focus groups and observation of practice | Four principal barriers to young mothers initiating and continuing to breastfeed on the postnatal ward: a disempowering birth experience, the ward as an alien environment, communication problems resulting from different cultural assumptions of young mothers and staff, and pressure to exclusively breastfeed. Young mothers require proactive, empathetic breastfeeding support on the postnatal ward, which both reassures and encourages them. Knowledge and attitudes of maternity professionals can positively or negatively influence young mothers' knowledge, comfort, confidence and therefore establishment of breastfeeding during hospital stay, or not. The intervention developed a more positive and enabling attitude of staff towards young women, however, the context of a busy, task-orientated, medical environment negatively influenced the success of the intervention. | Small study sample (15 young mothers), limited geographical setting. Low response rate for some parts of data collection (questionnaires, evaluation forms) |

school feeding interventions that explained how and why the findings from a Cochrane review of the same interventions differed across populations, contexts and circumstances.²⁷

Realist research contributed to understanding how and why diverse intervention outcomes may occur. For some interventions, this was the first study to provide a preliminary understanding.

'This study is the first to elucidate possible reasons why women may experience these different outcomes'.²¹

For other complex interventions, realist research built on existing theory and research findings to develop a deeper, more nuanced understanding of the mechanisms that contributed to intervention outcomes and the influence of context. One realist evaluation of school food and drink policy provided insight into how stakeholders responded in different ways based on how they viewed the mandatory nature of the policy (a feature of their context), which then led to varied implementation and compliance. These findings were used to scaffold existing intervention theory:

'Previous studies have found that mandatory nature of policy motivates some school-level stakeholders towards implementation, however, this study found this is not necessarily the case in practice, as some stakeholders were reported to take limited or no action because of their aversion to the paternalistic nature of mandatory interventions'.²³

All five of the realist reviews defined context as being more than concepts of 'geography' or 'place'. Ohly et al used the definition for context provided by Pawson⁸ in their realist review of the Healthy Start Food Voucher intervention. This definition refers to context as having multiple layers: 'individual, interpersonal, institutional and infrastructural'. While the aim of the review was to identify outcomes linked to contexts at all four levels, insufficient evidence to comment on contexts at the institutional and infrastructural levels was reported. Hence the intervention theories presented by the study focused on how individual and interpersonal contexts influenced why the intervention worked.

In Trickey et al's review of breastfeeding support interventions, three separate contexts were identified: social context, infant feeding context and health service context.²⁵ Within each of the selected studies, these different contexts were described. For example, a single study analysed for potential intervention theories highlighted that the intervention took place in Scotland, and the context was defined as 'high levels of deprivation, very low breastfeeding rates, health professionals

ambivalent about breastfeeding...' This description allowed the authors to look for similar contextual attributes across the other included cases.

Included realist evaluation studies also highlighted how context is deeper and more nuanced than setting. Ohly et al identified how participants' response to being given food vouchers were influenced by elements of context at the individual and interpersonal level, such as participants' values, beliefs and motivations about healthy eating.²⁶ In that study, different values, beliefs and motivations about healthy eating shaped how participants used the food vouchers, leading to intended and unintended outcomes.

In a multiple case study approach, Levay et al^{22,23} purposely selected rural and urban districts to explore how context may influence the implementation of a school food and drink policy. Levay sought data to understand how and why a district being 'rural' or 'urban', contributed to understanding differences in policy implementation across these settings. They described how vendor availability is a feature of, and varies between, rural and urban implementation settings (context). If procurement of compliant products (the focus of the study) is not possible, then the ability of an area to acquire them is negatively impacted and the area is seen as non-compliant, despite participants wanting to comply.

In urban contexts there is a high availability of vendors, which can influence availability of compliant products—availability tends to be higher. In rural settings, there are less vendors, therefore procurement of compliant products is more difficult so even where school administrators and volunteers are motivated to implement and comply with the policy, they can be limited by available infrastructure.²³

Each of the selected studies highlighted the benefits of using intervention theory as the unit of analysis. All five of the selected realist reviews emphasised the importance of intervention theory analysis in providing tangible recommendations for policymakers around complex public health interventions. Several authors claimed that the complexity and heterogeneity of these interventions restricts the usefulness of traditional systematic reviews for policy makers.

'Simply knowing that feeding programs work is not enough for policymakers to decide on the type of intervention that should be implemented'.²⁷

'Agency is synonymous with realist mechanisms (the reasoning and reactions of individuals in response to the resources offered by the program), and this review illustrates the contribution of realist methodology to

understanding differential impacts of public health interventions or programs.²⁶

All four of the realist evaluations also described how the theory-driven approach provided evidence-based, plausible explanations for intervention outcomes, which could be transferable to other interventions. Ohly et al, for example, used findings to develop a theoretical model of change, which could be transferable not only to other food voucher interventions, but other interventions where similar mechanisms may occur.²¹

'Although this model was based on evidence-based program theories about the Healthy Start program, similar mechanisms relating to prioritisation and reinforced motivation may be transferable to other food voucher programs, and perhaps other types of financial support programs designed to encourage dietary improvement'.²¹

A potential challenge of realist reviews was identified across several papers, which related to a lack of detailed data about interventions in published studies (ie, what was performed, by whom, to whom, for how long) and a lack of information about why the intervention was expected to work (intervention theory).

'The attempt to identify intervention theories from the included cases confirms that intervention designs underpinning experimental studies have tended to be undertheorised and highlight heterogeneity among studied interventions. Descriptions of intervention theory were frequently absent from the intervention case materials'.²⁵

'...we were unable to distinguish between something that was not done and something that was done but not reported on because of the stringent word count constraints of medical journals'.²⁷

A number of realist evaluations described a single case study and/or common methodological challenges, such as small sample sizes and challenges with data collection. Levay's study of multiple cases across different geographical settings described inconsistency in the source of data across cases due to variation in how researchers were able to collect data in each school district.²² However, this did not impact on the quality of the findings, as researchers were able to identify the same mechanisms (theory) across cases.

'Regardless of whether it was a principal in one district discussing a particular mechanism or a district office staff in a different district discussing the same mechanism, the mechanisms are the same and conclusions can be inferred as to what contextual factors might actually be influencing

the underlying mechanisms across context and across individual stakeholders'.²²

Similarly, realist reviews defined evidence for inclusion as information relevant to the testing and creating of intervention theory. This helped to overcome limitations in the availability of data on a particular intervention theory from traditional sources or study designs. As Harris et al stated:

'A method that allows the inclusion of a range of different study designs has considerable merit as each design approach may reveal different elements of the intervention are important in fully understanding the mechanisms, and how they are shaped by context and to what types of outcomes these might lead'.²⁹

Indeed, Harris et al went beyond using published data and incorporated stakeholders into the theory development process. The following quote also emphasises how a realist methodology provides much-needed insight into how, why, for whom and under what circumstances complex interventions succeed or fail:

'Consulting with stakeholders became a critical part of the process because studies tended to focus on tangible processes and formally measurable outcomes. Informal or tacit information relating to interpersonal relationships and the subtle contextual conditions that may cause interventions to succeed or fail but were often missing from the papers'.²⁹

The transferability of realist review findings were also demonstrated. When analysing the included interventions Harris et al analysed studies individually, then compared them to develop transferable intervention theories.²⁹ These intervention theories were then scaffolded with formal theories relevant to health literacy. There were no examples across all included studies of interventions where research findings were reported to be translated to practice.

4 | DISCUSSION

This manuscript aimed to synthesise how realist approaches have been used in nutrition and dietetics research and what impact this had on findings, outcome and research translation. A targeted search of nutrition and dietetics specific journals identified four realist evaluations and five realist reviews. A narrative synthesis was carried out that described how realist research provided a deeper understanding of varied outcomes and the role of context in how and why interventions work. The findings of this study highlighted the importance of theory driven methods, the need to think differently about study quality and how realist findings could inform practice. In doing so, this study shows the

potential value in realist approaches for nutrition and dietetics research.

Realist research is well suited to complex, social interventions and this is reflected where realist research has been used in nutrition and dietetics to date. All manuscripts in this study described public health nutrition interventions, which are typically defined by a focus on understanding and addressing determinants of nutrition and health-related status in populations.³³ Public health nutrition practice also involves significant complexity as multiple, shifting determinants interact in different ways across diverse populations and contexts. Furthermore, it could also be argued that all areas of nutrition and dietetic practice are intrinsically complex in terms of the science of food and nutrition and the systems which dietetic practice must navigate, including health care and food systems.³⁴ As such, realist research is well placed as an approach to investigate and develop solutions to issues across all areas of nutrition and dietetic practice.

Food service is arguably an area of practice filled with complexity, as it spans health and food service systems, with multiple actors and competing drivers across sustainability and economics.³⁵⁻³⁷ Food service is also key to tackling malnutrition, a long-standing global issue, across settings including hospital and aged care.³⁸ Furthermore, malnutrition is complex; determinants of malnutrition are multifactorial and not presently well understood.³⁹ Traditionally, research in this area has focused on building a common understanding of the aetiology of malnutrition³⁹ and a recent systematic review concluded the need for more RCTs to provide high-quality evidence.^{40,41} However, given the complexities of malnutrition, an understanding of how it occurs across different contexts, and interventions that reflect this, could prove beneficial. Realist research offers such an approach to contribute to the development of effective interventions across food service and other practice areas to address malnutrition in the long term (Table 2).

Diverse outcomes of nutrition and dietetic interventions were illustrated in this study, both in realist reviews of existing published evidence and in empirical findings of realist evaluations. This is not surprising; diverse outcomes have been reported across many areas of nutrition and dietetics, including interventions in clinical practice.⁴² However, this study highlighted how realist research can make a unique contribution towards understanding how and why interventions outcomes may differ. These findings suggest that realist research can contribute to identify gaps in existing nutrition intervention research, in particular, a lack of information about context. A realist research paradigm anticipates varied outcomes, on the premise that interventions are complex, operating in complex environments, with broader social,

political and economic contexts that are multifactorial and diverse.⁴³ As such, realist researchers focus on understanding how context can influence mechanisms to produce outcomes. All of the included papers in this study gathered and analysed data pertaining to contexts and their interactions with underlying mechanisms. It was also observed that context was interpreted and operationalised in different ways across the studies, including context at multiple levels, similar to the socio-ecological determinants of health,⁴⁴ and defining specific contexts related to the intervention and setting. This reflects the way that realist research can explore context as it is relevant to the intervention theory. Overall, the focus on context in a realist approach facilitated a deeper understanding of how and why interventions work in different ways to produce wholly different outcomes, according to context.

Dietetic practice spans a diverse range of areas, however, as with many disciplines, research and in particular translation of research findings tends to be siloed. As a theory-driven approach, realist research provides opportunity to connect research across practice areas. Researchers may draw on evidence across different types of interventions, where similar mechanisms may contribute to intervention outcomes. Similarly, there is a level of generalisability of realist research findings, as rich, explanatory theory about how and why interventions work across different contexts can be transferable to other interventions, including similar interventions and those that are somewhat different.⁴⁵ This was reflected in this study, for example, as Ohly et al suggested that the theory about how and why women use food vouchers in different ways, based on context, which contributes to both intended and unintended outcomes, could be transferable not only to other food voucher interventions, but also other types of financial support interventions. These findings support the notion that realist research can provide portable theory about interventions and that findings can span across seemingly different interventions or practice areas to provide lessons there. In this way, realist research can support the ongoing accumulation and transfer of knowledge in nutrition and dietetics and break down research siloes.

The focus on theory as the unit of analysis also means that realist research can draw on diverse evidence that may not be captured by other research methods.^{46,47} Realist evaluations in this study were able to use data that would traditionally be considered lower quality, to contribute to rich theory building. Realist evaluation does not prescribe specific methods. In traditional hierarchies of evidence, whereby RCTs are considered the gold standard, qualitative research is perceived as less rigorous.^{8,48,49} Interestingly, all of the realist evaluations in

TABLE 2 Summary of the included published realist reviews from nutrition and dietetics specific journals included in narrative synthesis

| Reference | Aim and/or research questions | Setting and intervention | Methods | Quality appraisal | Formal theories identified | Results—Program Theory | Limitations |
|---------------------------------|--|---|---|---|---|---|---|
| Trickey et al. ²⁵ | <p>1. To explore heterogeneity in theoretical underpinnings and in intervention design among one-to-one breastfeeding peer support interventions;</p> <p>2. To inform design decisions by identifying transferable lessons developed from cross-case comparison of context-mechanism-outcome (CMO) relationships</p> <p>3. To inform evaluation design by identifying CMO relationships associated with experimental conditions.</p> | <p>United Kingdom</p> <p>Maternal and child nutrition</p> <p>Breastfeeding peer support interventions</p> | <p>Fifteen intervention cases were identified from searching index experimental studies.</p> <p>United States of America,⁹ United Kingdom,⁵ Canada¹</p> | <p>Quality was considered compromised where the following were lacking: (a) description of intervention theory, (b) description of intervention components, (c) a description of the infant feeding and health service context, (d) description of implementation, take-up, and fidelity issues, (e) existence of process evaluation, and (f) congruence between measured outcomes and intervention theory.</p> | <p>Social learning theory</p> | <p>This review indicates strongly that breast feeding peer support intervention design should incorporate theories (and associated intended mechanisms for change) operating at higher ecological levels.</p> | <p>Quality of included papers varied, and this review is limited to one on one peer support theories</p> |
| Ohly et al. ²⁶ | <p>To explore how low-income pregnant women use Healthy Start food vouchers, the potential impacts of the program, and which women might experience these impacts and why:</p> <p>How do low-income pregnant women use Healthy Start vouchers?</p> <p>What are the intended and unintended outcomes of the program?</p> <p>What are the underlying mechanisms and how do variations in context influence (enable or constrain) these mechanisms?</p> | <p>United Kingdom</p> <p>Maternal and child nutrition</p> <p>Use of Healthy start vouchers by low-income pregnant women</p> | <p>38 primary studies were included: four studies on Healthy Start program and 34 studies on Women, Infants and Children program.</p> <p>Two main outcome strands were identified: dietary improvements (intended) and financial assistance (unintended).</p> | <p>An assessment of 'rigour' was used to judge the credibility and trustworthiness of the evidence as it was integrated into the analysis and synthesis</p> | <p>No formal theories identified</p> | <p>Substitution effects: economics of decision making; responsible subversion</p> | <p>Lack of evidence to link program theory with sociodemographic and cultural characteristics, such as which groups of women are more/less likely to value healthy eating</p> |
| Greenhalgh et al. ²⁷ | <p>To determine what works, for whom and in what circumstances for trials of school feeding programs in disadvantaged children.</p> | <p>United Kingdom</p> <p>School feeding programs</p> | <p>18 studies (reported in 29 articles) were used to analyse four broad areas: historical context of school feeding programs; theories explaining their success; particle success, or failure and measurement issues</p> | <p>None reported</p> | <p>Correction of nutritional deficiencies theory</p> <p>hunger relief theory</p> <p>benevolent attention</p> <p>reduced absenteeism</p> <p>inspires improved home diet improved literacy reduces intergenerational cycle of poverty</p> | <p>Programmes should be aimed at children with documented nutritional deficiencies</p> <p>Programmes are more likely to be effective when designed in partnership with the local community and interventions are piloted</p> <p>In situations of absolute poverty even severely malnourished children may not benefit from school feeding programmes because they may receive less food at home</p> | <p>Limited by not including descriptive studies, theoretical papers, and grey literature.</p> |

TABLE 2 (Continued)

| Reference | Aim and/or research questions | Setting and intervention | Methods | Quality appraisal | Formal theories identified | Results—Program Theory | Limitations |
|-----------------------------|--|---|--|---|---|---|--|
| Maugeri et al ²⁸ | To explore for whom and under what circumstances nutrition education cooking interventions affect nutrition outcomes in adults. | Australia Cooking programs to improve public health | 11 programs included in this review. Programs meeting the search criteria were from 6 countries: Australia, Brazil, Canada, United States of American, England and Scotland. | Relevance and rigour | Social cognitive theory | A total of 7 context-mechanism-outcome configurations (CMO-Cs) were identified across the 11 programs, building on the initial program theory of 4 CMO-Cs relating to the nutrition-education cooking intervention strategies of hands on cooking, a skilled facilitator, and incorporating food access and family support | Lack of contextual depth in published papers |
| Harris et al ²⁹ | To undertake a participatory realist synthesis to develop a better understanding of the potential for community-based peer support to promote better health literacy and reduce health inequalities. What approaches to community engagement are most effective in promoting peer support, to which people and in what circumstances? How does community-based peer support impact on understanding of existing health information and the use of health information and health services to improve health and reduce health inequalities? | United Kingdom Community-based peer support to improve health literacy | Programs were selected based on context (within the United Kingdom) ³⁹ and then categorised into one of seven 'clusters'. | Stakeholder consultation provided further contextual information to the studies | The health belief model, theory of planned behaviour, and social cognitive theory; self-regulation with peer or social support. | Conditions of disparity compromise the relevance and uptake of the intervention, potentially disempowering peer supporters and participants alike. The reporting of linkages between mechanisms and outcomes was incomplete. This meant that configuration was required in order to hypothesise what the associations might be | |

TABLE 3 Glossary of key 'realist' terms

| Key term | Definition |
|---|--|
| Context | 'Context often pertains to the "backdrop" of programs and research. ... As these conditions change over time, the context may reflect aspects of those changes while the program is implemented. Examples of context include cultural norms and history of the community in which a program is implemented, the nature and scope of existing social networks, or built program infrastructure. ... They can also be trust-building processes, geographic location effects, funding sources, opportunities, or constraints. Context can thus be broadly understood as any condition that triggers and/or modifies the behaviour of a mechanism'. (p. 317) ⁴⁶ |
| Mechanism | '...mechanisms are underlying entities, processes or structures which operate in particular contexts to generate outcomes of interest'. ¹³ 'Mechanisms are the agents of change. They describe how the resources embedded in a program influence the reasoning and ultimately the behaviour of program subjects.' (p. 13) ⁵ |
| Outcome | 'Outcomes are either intended or unintended and can be proximal, intermediate or final... Examples of intervention outcomes are improved health status, increased use of health services, and enhanced research results.' (p. 317) ⁴⁶ They are what occurs when a mechanism is activated. |
| Theory | There are multiple definitions for the word 'theory'. One simple definition is that, 'A theory is an attempt to organize the facts—some 'proven', some more conjectural—within a domain of inquiry into a structurally coherent system'. ¹⁰ |
| Substantive theory | 'Existing theories within particular disciplines. They may be used to help understand interventions. For example, in the social sciences theories may deal with topics such as "cognitive development," "deviance control," "incentivisation" or any of the wider ambitions of interventions'. (p. 15) ⁵² |
| Middle Range theory | 'A theory that is specific enough to generate hypotheses (eg, in the form of propositions) to be tested in a particular case, or to help explain findings in a particular case, but general enough to apply across a number of cases or a number of domains'. (p. 15) ⁵² |
| Program theory | 'This is the theory about what a program or intervention is expected to do and in some cases, the theory about how it is expected to work. Realist program theory goes a little further and includes descriptions of contexts, mechanisms and outcomes'. (p. 10) ⁵² |
| Realist evaluation | 'Realist evaluation uses mainly primary data. The evaluator ventures into the field and collects data in order to develop, test and refine a programme theory to explain for whom and in what circumstances and why an intervention or programme works'. (p. 2) ¹¹ |
| Realist synthesis/review | 'Theory based approach to synthesising existing evidence'. ⁵² 'It is a form of systematic literature review... Realist synthesis uses mainly secondary data... The purpose is to synthesise findings from these studies and other relevant data to test and refine theories which explain in what circumstances and through what underlying causal processes interventions produce intended and unintended outcomes'. (p. 2) ¹¹ |
| Causation | Causation is about 'what causes what to happen'. (p. 1) ¹² 'The process whereby an outcome (O) of interest was generated by relevant mechanism(s) (M) being triggered in context (C)'. (p. 17) ⁵² |
| Context-mechanism-outcome configuration | CMO configuring is a heuristic used to generate causative explanations pertaining to the data. The process draws out and reflects on the relationship of context, mechanism, and outcome of interest in a particular program. (p. 316) ⁴⁶ In a sentence, they take the form of 'In "X" context, "Y" mechanism generates "Z" outcome'. (p. 13) ¹³ A simple example of a CMO configuration is as follows: A community experiences a high level of unemployment to which an employment training program is offered (context). But the program has low enrolment and attrition (outcome). The reason is that people have difficulty getting to the venue, owing to a lack of public transportation (mechanism). (p. 316-317) ⁴⁶ |
| Realist interviews | 'Theories are placed before the interviewee for them to comment on with a view to providing refinement. The subject matter of the interview is the researcher's theory and interviewees confirm, falsify, and refine this theory. This relationship—described as a teacher-learner cycle—is integral to realist evaluations.' (p. 1) ⁵³ |

this study gathered qualitative data and none reported quantitative data collection. Researchers also reported a small sample size, lower response rate and limited case settings. However, realist research was able to aid in overcoming what would traditionally be considered study limitations, as the quality of the data was determined by how it contributed to theory building and testing. Similarly, the use of a realist review, compared to a systematic review, by Harris to investigate community-based peer support in relation to health literacy allowed researchers to use 'grey' evidence gathered through stakeholder consultation. This provided key contextual information, which contributed to refined intervention theory, such as how conditions of disparity can compromise the relevance and uptake of the intervention and subsequent outcomes. These examples demonstrate how realist research requires a shift in thinking about research, focusing on how data contributes towards theory development, rather than only whether it is reproducible. In doing so, diverse data collection methods can be utilised in developing meaningful, transferable findings.

None of the studies included in this narrative study gave in-depth consideration of implementation of findings and this is an area in need of development in realist research. It has been proposed that realist research can provide practical and tangible recommendations to policy makers, particularly when planning and implementing interventions.¹⁴ However, realist research does not provide simple answers about whether interventions work or not,¹⁴ instead providing rich, explanatory theory of how and why interventions work across different contexts. Therefore, translating realist research to policy involves a different way of thinking about interventions and intervention findings; there is no one-size-fits-all approach. It is acknowledged that knowledge translation is a broad field; one scoping review conducted by Haynes et al. looked at the capacity of policy makers to use research findings, and found that among other factors, the usefulness of research to policy makers is context-specific and based on more than just academic hierarchies.⁴³ Therefore, realist research, in common with other forms of research, is subject to the context in which it is conducted, including characteristics of the policy makers, communities, organisations and broader environment. It is important, as with any research, that realist research is presented in a way that is easy for policy makers to understand and translate.⁵⁰ It is proposed that the applicability of realist research is that it takes into account context within the research and provides situation-specific wisdom,⁵¹ developing knowledge that matters locally. However, despite the promise of realist approaches to be more useful to decision makers, it was

not a focus of any of the papers in this study and is an area of further research both in nutrition and dietetics but also more broadly, to better understand if and how that occurs (Table 3).

This narrative synthesis of realist research in nutrition and dietetics has described how realist approaches have been used and highlighted future opportunities. Realist research is well placed to deal with the complexities of dietetic practice through a focus on theory about how and why interventions operate in different contexts to contribute to diverse outcomes. Future application of realist approaches could advance researchers' and practitioners' understanding of complex interventions and inform practice to contribute to meaningful outcomes.

AUTHOR CONTRIBUTIONS

The study was initially conceptualised by CP, an APD with extensive experience in health education research together with GJ and IM, APDs with experience in realist research. The researchers further developed and refined the study aim and strategy collaboratively with RH, who has significant expertise in realist research. GJ and IM were responsible for managing the study. The four researchers met regularly throughout the research and CP and RH provided expert review and input at key stages. All authors have approved this manuscript for submission and have not submitted this manuscript or parts of this manuscript elsewhere.

CONFLICT OF INTEREST

Clare Palermo is an Associate Editor for Nutrition & Dietetics. This manuscript has been managed throughout the review process by the Journal's Editor-in-Chief. The Journal operates a blinded peer review process and the peer reviewers for this manuscript were unaware of the authors of the manuscript. This process prevents authors who also hold an editorial role to influence the editorial decisions made. There are no other conflicts of interest to declare.

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